DEPARTMENT OF AGRICULTURE,
CEYLON.

BULLETIN No. 45.

TORTRIX FLIGHT BREAKS.

NIGEL K. JARDINE, F.E.S.

Entomologist for Tea Tortrix.

Peradeniya,

September, 1919.

COLOMBO:
H. C. COTTLE, GOVERNMENT PRINTER, CEYLON.

1919.

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TORTRIX FLIGHT BREAKS.

IT is known that the south-west monsoon is responsible for the general dissemination of Tea Tortrix, and also that every local breeze tends to distribute the moths over estates. It is, therefore, obvious that the means which will check this general distribution of the pest becomes an invaluable measure to any scheme of control. Such a measure is found in the proposed wind belts or flight breaks.

To realize fully the value of the flight breaks, it must be remembered that Tortrix moths do not fly high, nor do they fly long distances. Their average elevation above the ground is 5 to 7 feet, but they can *be swept up to considerable heights and driven considerable distances by the wind.*

When, however, an estate possesses numerous flight breaks, the area subject to the full sweep of the wind is reduced to a minimum, and, therefore, the area open to attack is reduced to a minimum. The area of tea ever likely to be sprayed is also reduced to a matter of square yards instead of acres. The flight breaks will restrict the normal flight of the moths to the areas of tea they enclose.

The matter of spraying tea has just been touched upon; and it would greatly simplify matters to explain what part spraying will play in conjunction with flight breaks. A non-arsenical wash which kills the insect, but which has no injurious effect on either the bush and its flushing capacity or the made tea, has been tested for over six months under estate conditions, and this wash has been proved to be thoroughly practicable. (A Bulletin detailing the work and experiments with this wash is in the Press.)

The objects of the flight breaks are: (1) To arrest the moth in its forced flight, and so check its spreading over the country; and (2) to afford it good breeding grounds. The intention is to stop the moth in its flight, and give it every encouragement to feed and establish itself in the flight breaks. By this means the pest will be kept from the tea, and each estate will aid in protecting neighbouring estates from attack. The insect will become localized to the flight breaks.

Now the natural and correct deduction is that at some time portions of the flight breaks will become over-crowded, and the insect will seek fresh feeding grounds, which will be the tea. The investigation is prepared for this, in that when portions of the flight breaks become over-crowded and the pest shows a tendency to migrate to the tea, the insect in the flight

breaks can be cheaply and conveniently killed by applying an arsenical wash to the breaks. In having breaks a distinct advantage is possessed, in that, though an arsenical wash must not be used upon the tea, there is nothing to prevent the use of arsenates upon trees which will not provide the marketable product. Competitive markets cannot accuse us of using poisons on marketable tea. Should the insect in search of new feeding grounds leave the flight breaks and attack the tea, it can be effectively killed out by the application of the non-arsenical wash above mentioned.

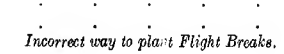
Any idea that large areas will have to be sprayed, or that spraying will have to be done frequently, may be abandoned. The flight breaks will reduce the area liable to attack, and they will also act as a protection against attack from neighbouring estates, and prevent the distribution of the insect from field to field.

It is clearly evident that without a system of flight breaks an estate will have no protection, and that a scheme of control becomes impossible, for, as arsenical washes must not be used on tea, the control would be reduced to a single wash, namely, a non-arsenical fluid. Although this fluid is moderate in cost, easily manufactured, completely efficacious, and very simply applied, and insures the bush against attack for two months, enormous areas would have to be sprayed every two months to insure the tea from subsequent attack. This makes the measure impracticable. The fact is, therefore, evident that flight breaks *must* be established if Tortrix is to be controlled.

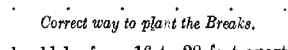
The decision as to what trees are best suited to act as flight breaks depends entirely upon the locality, and the planter is best able to decide this point, for he knows what plants are suitable to his soil and climate.

A green manure should be selected: let it be either Acacia, Albizzia, Dadap, or Boga-medeloa, for by selecting a manurial tree estate conditions are in no way altered. Grevillea might also be employed.

The trees should be planted in double rows, so as to form an unbroken barrier right across the selected area, and not directly opposite to one another.



Incorrect way to plant Flight Breaks.



Correct way to plant the Breaks.

The rows should be from 16 to 28 feet apart, with 100 to 150 yards dividing the belts. As a guide to where belts should be placed, the rule that the crest of every ridge from top to bottom should have a flight break will seldom, if ever,

be impracticable ; 100 to 150 yards on either side of this belt others should be planted, taking the direction which, in the estimation of the planter, is the most suitable as a wind break.

These belts should never be allowed to grow higher than 10 to 12 feet, so as to facilitate spraying when necessary, and should be lopped in such a way as to become dense in foliage, in order to form a complete barrier to the moth. From the planter's point of view the scheme is perfectly practicable. This statement is made after close discussion with numerous planters. It has been suggested that the amount of ground necessary for flight breaks will be wasted for tea growing. This view is erroneous, for, as the acreage of tea will in no way be interfered with, there can be no possibility of waste of ground. Every estate possesses its green manure trees ; some have many thousands, some but a few, and these trees never displace tea. The same principle is required for flight breaks, the only difference being that, instead of having the manurial trees scattered more or less indiscriminately over the estate, they be placed in definite double rows 100 to 150 yards apart all over the estate. The leguminous trees already established need not be interfered with.

Another difficulty which was raised was that in some districts " no leguminous trees will grow." Tea is present, however, and flourishing. I would suggest in this case that two adjacent rows of tea be allowed to grow up to seed bearers ; they will form admirable flight breaks, and no harm will accrue to the bushes as a future profitable concern. After an interval of a few years they can be pruned down, and the next two adjacent rows used as breaks for a few years. In a district where no leguminous trees will grow, it may be safely assumed that the tea of that district in comparison to others is not of the strongest flushing capacity ; and were Tortrix to establish itself in such tea, the loss of flush would be very severe ; and it may be safely argued that the loss incurred by sacrificing certain rows of tea will be repaid by the protection against Tortrix these rows will afford.

It is of vital importance that the flight breaks be planted up as early as possible, for some four years must elapse before they reach the required height and density of foliage to be useful, and until they do function fully the scheme of control cannot be operative. The investigation would, therefore, urge the necessity of full co-operation, and that every estate plant up these breaks as early as possible. Many estates do not possess Tortrix, but that is no criterion they will not be attacked. The pest is obviously spreading, and at present there is nothing to check its distribution. It is true that when an estate suffers a bad attack, the pest " kills itself out." This is due to the presence of the polyhedral disease—an

agent over which at present there is no control—which develops rapidly when a colony of larvæ become very numerous; but though the pest becomes "killed out" ultimately, the damage is already done.

The scheme of control may be summarized thus :—

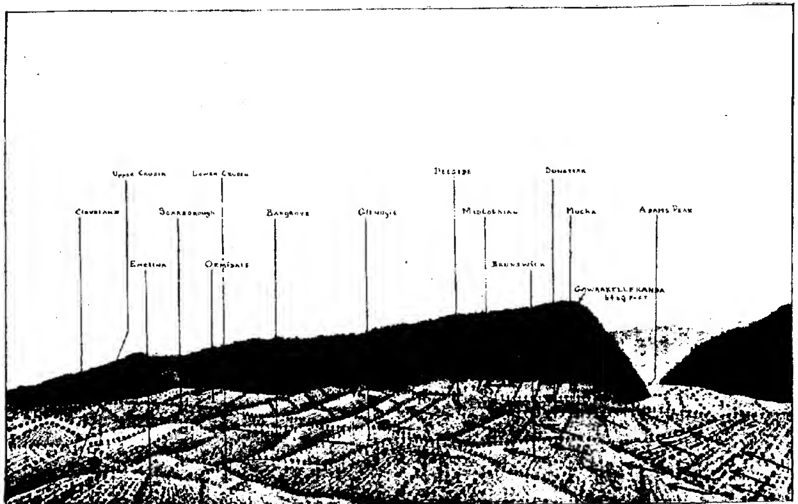
(1) Flight breaks will arrest the pest in its forced flight.
(2) They will check the general distribution of the insect.
(3) The areas of tea liable to attack will be reduced to the minimum.
(4) The pest will be localized in the flight breaks.
(5) The flight breaks will lend themselves to easy spraying when necessary, and the pest will be killed.
(6) Should the tea between the breaks become attacked the investigation possesses a wash which will kill the insect on the tea or drive it back to the breaks.
(7) Each estate insures itself and its neighbours from attack.
(8) By such measures will the pest be prevented from developing to serious proportions.
(9) Once the general distribution of the insect is checked, artificial remedial measures become practicable and worth while, and the pest will be reduced to the level of its parasite control.

NIGEL K. JARDINE,
Peradeniya, July, 1919. Entomologist for Tea Tortrix.

The illustration on the opposite page is a more or less diagrammatic representation of a portion of the Maskeliya Valley very liable to infection by Tortrix as the result of the south-west monsoon. The arrows indicate the direction of the prevailing wind. The monsoon is attracted to the mountain Gowrakellekanda; it sweeps over the valley to this hill, and curves to follow the range. Every aspect exposed to the wind is liable to attack by Tortrix, especially those ridges near the mountain range. At the present moment with no flight breaks established, when an estate gets Tortrix, and the Superintendent takes measures against the attack, his estate is all the time liable to subsequent attacks. By establishing flight breaks his tea is definitely insured against invasion of the pest.

In the illustration an endeavour has been made to show where flight breaks should be planted in this portion of the Maskeliya Valley. The breaks are shown in single rows in order to avoid confusion. The sketch is a more or less accurate conception of the land as seen from the experimental area on Emelina estate, and it is reproduced in the hope that it may illustrate the Flight Break proposals.

H. C. COTTLE, GOVERNMENT PRINTER, COLOMBO, CEYLON.


Scarborough
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